

What is Claimed:

Claim 1. An active suture comprising:

5 a braided suture having proximal and distal ends and an outer diameter; and

at least one passageway coaxial with at least a portion of the braided suture, and having proximal and distal ends and a diameter that is less than the outer diameter of the braided suture;

10 wherein the distal end of the at least one passageway is disposed between the proximal and distal ends of the braided suture.

Claim 2. An active suture comprising:

a braided suture having an outer diameter; and

15 a tube coaxial with at least a portion of the braided suture, having an outer diameter that is less than the outer diameter of the braided suture and an inner diameter, and having one or more opening therein;

wherein the ratio of the outer diameter of the tube to the inner diameter of the tube is greater than 1.7.

20 Claim 3. An active suture comprising a first braided suture having an outer diameter and having embedded therein a coated fiber tow or coated braided suture coaxial with at least a portion of the first braided suture, said coated fiber tow or coated braided suture having an outer diameter that is less than the outer diameter of the first braided suture, and said coated fiber
25 tow or coated braided suture having one or more opening therein.

Claim 4. The active suture of claim 1, where the at least one passageway is a lumen of a tube.

Claim 5. The active suture of claim 1, where the at least one passageway is within a coated fiber tow or a coated braided suture.

5 Claim 6. The active suture of claim 4, where the tube has one or more holes that connect the lumen to the outer surface of the tube.

10 Claim 7. The active suture of claim 5, where the coated fiber tow or coated braided suture has one or more holes that connect the at least one passageway to the outer surface of the coated fiber tow or coated braided suture.

15 Claim 8. The active suture of claim 1, 2 or 3, further comprising a connector located on the proximal end of the at least one passageway, on one end of the tube, or on one end of the coated fiber tow or braided suture, said connector being capable of attachment directly to a hypodermic needle or indirectly to an intravenous delivery system or fluid pump.

20 Claim 9. The active suture of claim 1, 2 or 3 further comprising an inflatable reservoir on the proximal end of the at least one passageway, on one end of the tube, or on one end of the coated fiber tow or braided suture.

25 Claim 10. The active suture of claim 9, further comprising a connector proximal to the inflatable reservoir.

Claim 11. A method of closing a wound using a suture / needle assembly comprising a braided suture having proximal and distal ends, an outer diameter, at least one passageway coaxial with at least a portion of the

braided suture, said passageway having proximal and distal ends and a diameter that is less than the outer diameter of the braided suture, wherein the distal end of the at least one passageway is disposed between the proximal and distal ends of the braided suture; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the at least one passageway, comprising the steps of:

connecting the connector on the proximal end of the at least one passageway directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the at least one passageway;

introducing the suture / needle assembly into tissue surrounding the wound such that the distal end of the at least one passageway is at or in the proximity of the wound; and

closing the wound with the braided suture.

Claim 12. A method of administering a fluid to a wound that has been closed using a braided suture having proximal and distal ends, an outer diameter, at least one passageway coaxial with at least a portion of the braided suture, said passageway having proximal and distal ends, an opening at the distal end and a diameter that is less than the outer diameter of the braided suture, wherein the distal end of the at least one passageway is disposed between the proximal and distal ends of the braided suture; and a connector attached to the proximal end of the at least one passageway; such that the distal end of the at least one passageway is at or in the proximity of the wound, comprising the steps of:

connecting the connector on the proximal end of the at least one passageway directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the at least one passageway; and

allowing the fluid to exit the opening at the distal end of the at least one passageway into at least a portion of the braided suture at or in the proximity of the wound.

Claim 13. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a braided suture having proximal and distal ends, an outer diameter; at least one passageway coaxial with at least a portion of the braided suture, said passageway having proximal and distal ends, an opening at the distal end and a diameter that is less than the outer diameter of the braided suture, wherein the distal end of the at least one passageway is disposed between the proximal and distal ends of the braided suture; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the at least one passageway; comprising the steps of:

introducing the suture / needle assembly into tissue surrounding the wound such that the distal end of the at least one passageway is at or in the proximity of the wound;

closing the wound with the braided suture;

connecting the connector on the proximal end of the at least one passageway directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the at least one passageway; and

allowing the fluid to exit the opening at the distal end of the at least one passageway into at least a portion of the braided suture at or in the proximity of the wound.

Claim 14. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a braided suture having proximal and distal ends, an outer diameter; at least one passageway coaxial with at least a portion of the braided suture, said passageway having proximal and distal ends, an opening at the distal end and a diameter that is less than the outer diameter of the braided suture, wherein the distal end of the at least one passageway is disposed between the proximal and distal ends of the braided suture; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the at least one passageway; comprising the steps of:

connecting the connector on the proximal end of the at least one passageway directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the at least one passageway;

allowing the fluid to exit the opening at the distal end of the at least one passageway into at least a portion of the braided suture;

introducing the suture / needle assembly into tissue surrounding the wound such that the distal end of the at least one passageway is at or in the proximity of the wound; and

closing the wound with the braided suture.

Claim 15. A method of closing a wound using a suture / needle assembly comprising a braided suture having proximal and distal ends and an outer diameter; a tube coaxial with at least a portion of the braided suture, said tube having proximal and distal ends, an outer diameter that is less than the outer diameter of the braided suture, an inner diameter, and one or more openings therein, wherein the ratio of the outer diameter of the tube to the inner diameter of the tube is greater than 1.7; a surgical needle attached to

the distal end of the braided suture; and a connector attached to the proximal end of the tube; comprising the steps of:

connecting the connector on the proximal end of the tube directly or indirectly to a reservoir comprising the fluid;

5 exerting pressure on the fluid to force the fluid to enter into the connector and the tube;

introducing the suture / needle assembly into tissue surrounding the wound such that the one or more openings in the tube is at or in the proximity of the wound; and

10 closing the wound with the braided suture.

Claim 16. A method of administering a fluid to a wound that has been closed using a braided suture having an outer diameter; a tube coaxial with at least a portion of the braided suture, said tube having proximal and distal ends, an outer diameter that is less than the outer diameter of the braided suture, an inner diameter, and one or more openings therein, wherein the ratio of the outer diameter of the tube to the inner diameter of the tube is greater than 1.7; and a connector attached to the proximal end of the tube; such that the one or more openings in the tube is at or in the proximity of the wound, comprising the steps of:

15 connecting the connector on the proximal end of the tube directly or indirectly to a reservoir comprising the fluid;

 exerting pressure on the fluid to force the fluid to enter into the connector and the tube; and

20 allowing the fluid to exit the one or more openings in the tube into at least a portion of the braided suture at or in the proximity of the wound.

Claim 17. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a braided suture having proximal and distal ends and an outer diameter, a tube coaxial with at least a portion of the braided suture, said tube having proximal and distal ends, an
5 outer diameter that is less than the outer diameter of the braided suture, an inner diameter, and one or more openings therein, wherein the ratio of the outer diameter of the tube to the inner diameter of the tube is greater than 1.7; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the tube; comprising the steps of:

10 introducing the suture / needle assembly into a tissue surrounding the wound such that the one or more openings in the tube is at or in the proximity of the wound;

closing the wound with the braided suture;

15 connecting the connector on the proximal end of the tube directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the tube; and

20 allowing the fluid to exit the one or more openings of the tube into at least a portion of the braided suture at or in the proximity of the wound.

Claim 18. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a braided suture having proximal and distal ends and an outer diameter, a tube coaxial with at least a portion of the braided suture, said tube having proximal and distal ends, an
25 outer diameter that is less than the outer diameter of the braided suture, an inner diameter, and one or more openings therein, wherein the ratio of the outer diameter of the tube to the inner diameter of the tube is greater than

1.7; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the tube; comprising the steps of:

connecting the connector on the proximal end of the tube directly or indirectly to a reservoir comprising the fluid;

5 exerting pressure on the fluid to force the fluid to enter into the connector and the tube;

allowing the fluid to exit the one or more openings of the tube into at least a portion of the braided suture;

10 introducing the suture / needle assembly into a tissue surrounding the wound such that the one or more openings in the tube is at or in the proximity of the wound; and

closing the wound with the braided suture.

Claim 19. A method of closing a wound using a suture / needle assembly comprising a first braided suture having an outer diameter, a coated fiber tow or braided suture coaxial with at least a portion of the first braided suture, said coated fiber tow or braided suture having proximal and distal ends, an outer diameter that is less than the outer diameter of the first braided suture, and one or more openings therein; a surgical needle attached to the distal end of the braided suture; and a connector attached to the proximal end of the tube; comprising the steps of:

15 connecting the connector on the proximal end of the coated fiber tow or braided suture directly or indirectly to a reservoir comprising the fluid;

20 exerting pressure on the fluid to force the fluid to enter into the connector and the coated fiber tow or braided suture;

25 introducing the suture / needle assembly into tissue surrounding the wound such that the one or more openings in the coated fiber tow or braided suture is at or in the proximity of the wound; and

closing the wound with the first braided suture.

5 Claim 20. A method of administering a fluid to a wound that has been closed using a first braided suture having an outer diameter, a coated fiber tow or braided suture coaxial with at least a portion of the first braided suture, said coated fiber tow or braided suture having proximal and distal ends, an outer diameter that is less than the outer diameter of the first braided suture, and one or more openings therein; and a connector attached to the proximal end of the coated fiber tow or braided suture; such that the
10 one or more openings in the coated fiber tow or braided suture is at or in the proximity of the wound, comprising the steps of:

connecting the connector on the proximal end of the coated fiber tow or braided suture directly or indirectly to a reservoir comprising the fluid;

15 exerting pressure on the fluid to force the fluid to enter into the connector and the coated fiber tow or braided suture; and

allowing the fluid to exit the one or more openings in the coated fiber tow or braided suture into at least a portion of the first braided suture at or in the proximity of the wound.

20 Claim 21. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a first braided suture having proximal and distal ends and an outer diameter, a coated fiber tow or braided suture coaxial with at least a portion of the first braided suture, said coated fiber tow or braided suture having proximal and distal ends, an outer
25 diameter that is less than the outer diameter of the first braided suture, and one or more openings therein; a surgical needle attached to the distal end of the first braided suture; and a connector attached to the proximal end of the coated fiber tow or braided suture; comprising the steps of:

introducing the suture / needle assembly into tissue surrounding the wound such that the one or more openings in the coated fiber tow or braided suture is at or in the proximity of the wound;

closing the wound with the first braided suture;

5 connecting the connector on the proximal end of the coated fiber tow or braided suture directly or indirectly to a reservoir comprising the fluid;

exerting pressure on the fluid to force the fluid to enter into the connector and the coated fiber tow or braided suture; and

10 allowing the fluid to exit the one or more openings of the coated fiber tow or braided suture into at least a portion of the first braided suture at or in the proximity of the wound.

Claim 22. A method of closing a wound and administering a fluid to a wound using a suture /needle assembly comprising a first braided suture
15 having proximal and distal ends and an outer diameter, a coated fiber tow or braided suture coaxial with at least a portion of the first braided suture, said coated fiber tow or braided suture having proximal and distal ends, an outer diameter that is less than the outer diameter of the first braided suture, and one or more openings therein; a surgical needle attached to the distal end of
20 the first braided suture; and a connector attached to the proximal end of the coated fiber tow or braided suture; comprising the steps of:

connecting the connector on the proximal end of the coated fiber tow or braided suture directly or indirectly to a reservoir comprising the fluid;

25 exerting pressure on the fluid to force the fluid to enter into the connector and the coated fiber tow or braided suture;

allowing the fluid to exit the one or more openings of the coated fiber tow or braided suture into at least a portion of the first braided suture;

introducing the suture / needle assembly into tissue surrounding the wound such that the one or more openings in the coated fiber tow or braided suture is at or in the proximity of the wound; and
closing the wound with the first braided suture.

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Claim 23. The method of claim 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 or 22 where the reservoir is a syringe and pressure is exerted on the fluid via manual operation of the syringe.

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Claim 24. The method of claim 12, 13, 14, 16, 17, 18, 20, 21 or 22 where the reservoir is an intravenous delivery system and pressure is exerted on the fluid by elevating the reservoir to at least 0.5 meter above the wound.

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Claim 25. The method of claim 12, 13, 14, 16, 17, 18, 20, 21 or 22 where pressure is exerted on the fluid via a pump or an inflatable reservoir.